

24 April 1974

SOLID STATE DETECTOR SPECIFICATION 123Z030

DESCRIPTION:

A 3 mm double concentric lithium drifted detector with 24 mm diameter of center active area and 40 mm total diameter of active wafer. Each detector shall be unambiguously marked in a consistent manner so that no two wafers can be confused. A transmission type test mount with the following characteristics shall be supplied with each detector:

- a) Connector shall be 93 ohm microdot.
- b) Contact to lithium diffused side of detector shall be a pressure contact of minimum surface area.
- c) Wafer shall be easily removable from test mount.

Each detector shall be tested prior to shipment in a vacuum of $\leq 8 \times 10^{-6}$ torr for at least 12 hours to guarantee that the detector is vacuum stable and within specifications.

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<u>Parameter (Note 1)</u>	<u>Min.</u>	<u>Typ.</u>	<u>Max.</u>	<u>Units</u>	<u>Notes</u>
Diameter of center active area	23.9	24.0	24.1	mm	2 (Fig. 1)
Diameter of Active Wafer	40.0			mm	2 (Fig. 1)
Concentricity of inner and outer areas			0.5	mm	3
Depletion depth of active area	3.0			mm	
Inner groove width		0.5	1.0	mm	(Fig. 1)
Wafer diameter	1.882	1.885	1.888	inch	(Fig. 1)
Thickness of peripheral area	.1315	.133	.1345	inch	(Fig. 1)
Thickness of active area		.128	$\approx 3.25 \text{ mm}$		4 (Fig. 1)
Surface deadlayer-ungrooved side			150	$\mu\text{g}/\text{cm}^2$	
Bias voltage for full depletion			150	volts	5
Detector breakdown voltage	900			volts	6
Operating voltage		500		volts	
Leakage current					7
center area			5	μA	
outer area			5	μA	
Beta particle energy resolution					8
center area			70	KeV (FWHM)	
outer area			70	KeV (FWHM)	
Operating temperature	-40		+40	$^{\circ}\text{C}$	9

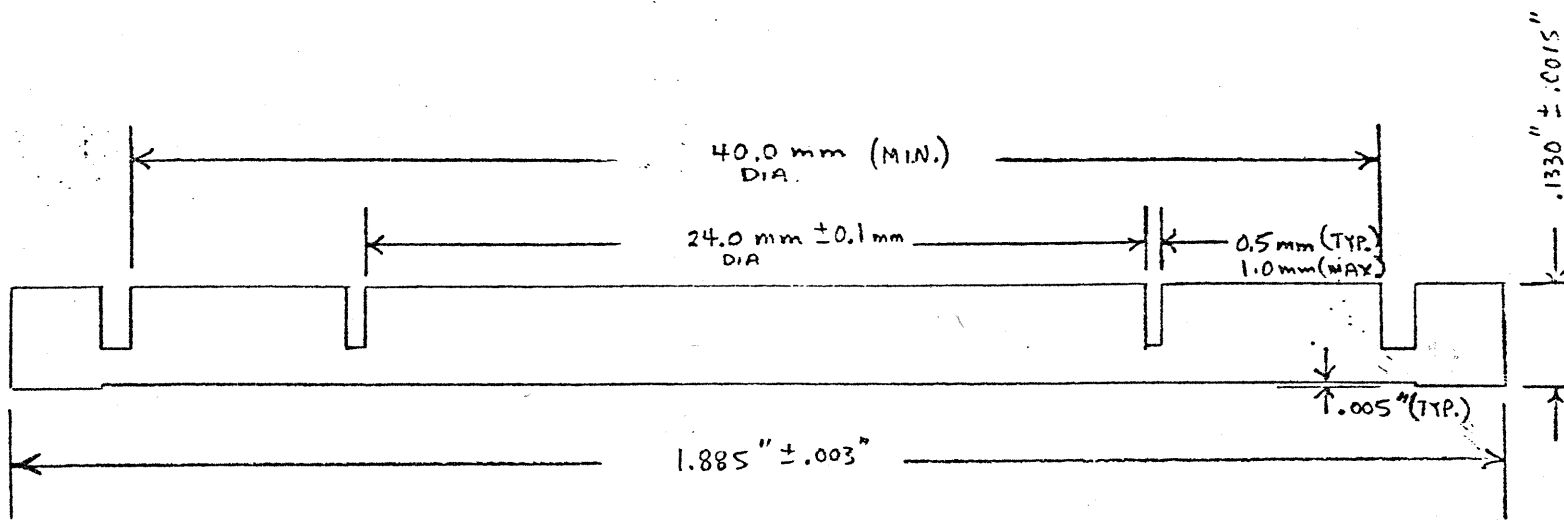
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NOTES:

- 1) All parameters measured at $23 \pm 3^{\circ}\text{C}$ and 1 atmosphere unless otherwise noted.
- 2) The gold contact on the grooved side of the detector shall be circular and concentric with outside diameter of wafer. This contact shall be uniformly deposited over the active area and shall extend to within 1/4 mm of active area edges.
- 3) Distance between center of grooved circle and center of wafer.
- 4) Maximum thickness of center area shall not exceed minimum thickness of peripheral area.
- 5) Full depletion as measured by Bi^{207} electrons.
- 6) Defined as a sharp increase in the slope of a log-log plot of the device's leakage current versus applied bias.
- 7) Leakage current measured under the following conditions:

Bias voltage:	500 volts on both active areas
Pressure:	$< 10^{-6}$ and 1 atm
- 8) Beta particle energy resolution measurements shall be made under the following conditions:
 - a) Source: Bi^{207} (uncollimated, 972 KeV conversion electrons)
 - b) Entrance window: ungrooved side
 - c) Detector to source spacing: ≈ 1.5 times active diameter of detector
 - d) Detector bias: 500 volts on both active areas
 - e) Amplifier shaping: 0.8 microsecond equal differentiation and integration
 - f) System electronics: Tennelec standard commercially available or equivalent
- 9) Detector shall operate properly over the stated temperature range at 1 atm. and in a vacuum of $\leq 10^{-6}$ torr.



WJS - TET DETECTOR

4/11/74 AC

FIGURE 1